What is claimed is:

1. A semiconductor device comprising:

a semiconductor substrate;

a first region defined on the semiconductor substrate and having a first device formation region isolated by a device isolation portion formed by filling an insulator in a trench formed in the semiconductor substrate;

a first device provided in the first device formation region;

a second region defined on the semiconductor substrate separately from the first region and having a second device formation region; and

a second device provided in the second device formation region and having a higher breakdown voltage than the first device, the second device having a drift drain structure in which a LOCOS oxide film thicker than a gate insulation film thereof is disposed at an edge of a gate electrode thereof.

2. A semiconductor device as set forth in claim 1, wherein the second device formation region is a region isolated by a device isolation portion formed by filling an insulator in a trench formed in the semiconductor substrate.

3. A semiconductor device as set forth in claim 1,

wherein the second device formation region is a region isolated by a LOCOS oxide film.

4. A semiconductor device as set forth in claim 1, wherein the first device has a smaller device size than the second device.

5. A semiconductor device production method comprising the steps of:

forming a device isolation portion in a first region on a semiconductor substrate by filling an insulator in a trench formed in the semiconductor substrate to define a first device formation region isolated by the device isolation portion;

defining a second device formation region in a second region different from the first region on the semiconductor substrate;

forming a first device in the first device formation region; and

forming a second device having a higher breakdown voltage than the first device in the second device formation region, the second device having a drift drain structure in which a LOCOS oxide film thicker than a gate insulation film thereof is disposed at an edge of a gate electrode thereof.

6. A semiconductor device production method comprising the steps of:

forming a nitride film which entirely covers a first region on a semiconductor substrate and covers a predetermined region of a second region on the semiconductor substrate;

forming an oxide layer on an entire surface of the nitride film;

forming a resist film above the nitride film after the oxide layer forming step, the resist film having a pattern which covers the first region and uncovers a predetermined oxide film formation region in the second region;

selectively removing a portion of the oxide layer formed on the surface of the nitride film in the oxide film formation region by wet etching with a fluoric acid solution by using the resist film as a mask to uncover a portion of the nitride film underlying the oxide layer portion;

removing the resist film;

removing the uncovered portion of the nitride film by a phosphoric acid solution heated at a predetermined temperature higher than a room temperature; and

forming an oxide film by thermal oxidation in a surface of the semiconductor substrate in the oxide film formation region freed of the nitride film.

7. A semiconductor device production method as set forth in claim 6, further comprising the steps of:

forming a first device in the first region; and

forming a second device having a higher breakdown voltage than the first device in the second region.

8. A semiconductor device production method as set forth in claim 6, wherein the oxide film formation region in the second region includes a channel region of a transistor.

9. A semiconductor device production method comprising the steps of:

forming a nitride film on a semiconductor substrate, the nitride film having an opening in a first oxide film formation region and covering a second oxide film formation region and a third oxide film formation region;

forming a first oxide film having a first thickness in the first oxide film formation region by performing a thermal oxidation process on the semiconductor substrate by using the nitride film as an oxidation resistant mask;

forming an oxide layer which covers a surface of the nitride film;

forming a resist film on the resulting semiconductor substrate, the resist film having an opening in the second oxide film formation region and covering the third oxide film formation region;

removing a portion of the oxide layer covering the surface of the nitride film in the second oxide film formation region by wet etching with a fluoric acid solution by using the resist film as a mask;

removing the resist film;

removing a portion of the nitride film freed of the oxide layer in the second oxide film formation region by wet etching with a phosphoric acid solution at a temperature higher than a room temperature;

forming a second oxide film having a second thickness smaller than the first thickness in a region of the second oxide film formation region freed of the nitride film by thermal oxidation;

removing a portion of the oxide layer covering the surface of the nitride film in the third oxide film formation region by wet etching with a fluoric acid solution;

removing a portion of the nitride film freed of the oxide layer in the third oxide film formation region by wet etching with a phosphoric acid solution at a temperature higher than the room temperature; and

forming a third oxide film having a third thickness smaller than the second thickness in a region of the third oxide film formation region freed of the nitride film by thermal oxidation.

10. A semiconductor device production method as set forth in claim 9, further comprising the steps of:

forming a first transistor having a gate oxide film defined by the third oxide film; and

forming a second transistor having a gate oxide film defined by the second oxide film and having a higher breakdown voltage than the first transistor.

11. A semiconductor device production method as set forth in claim 10, wherein the first oxide film is an oxide film located at an edge of a gate electrode of the second transistor and having a greater thickness than the second oxide film defined as the gate oxide film of the second transistor.

12. A semiconductor device production method as set forth in claim 10, wherein the first oxide film includes a LOCOS oxide film which isolates a device formation region on the semiconductor substrate.

13. A semiconductor device production method comprising the steps of:

forming a trench adjacent to a channel region in a semiconductor substrate;

filling an oxide film in the trench;

forming an oxidation resistant mask film which covers the channel region as protruding by a predetermined distance on the trench and uncovers a portion of the oxide

film in the trench adjacent to a boundary between the channel region and the trench;

performing a selective thermal oxidation process by using the oxidation resistant mask film as a mask to cause a bird's beak to grow as extending from the trench to the channel region; and

forming a gate oxide film on the channel region after the selective thermal oxidation step.

14. A semiconductor device production method as set forth in claim 13, wherein

the oxidation resistant mask film forming step comprises the step of forming the oxidation resistant mask film into a pattern which uncovers a pair of regions on opposite sides of the channel region, and

the selective thermal oxidation step comprises the step of growing LOCOS oxide films in the pair of regions.

15. A semiconductor device production method as set forth in claim 13, wherein the trench forming step comprises the step of forming trenches in a pair of regions on opposite sides of the channel region.

16. A semiconductor device production method as set forth in claim 14, further comprising the steps of:

implanting impurity ions into the pair of regions before the selective thermal oxidation step; and

forming a pair of drift layers on the opposite

sides of the channel region by thermally diffusing the impurity ions in the pair of regions in the semiconductor substrate by heat applied to the semiconductor substrate in the selective thermal oxidation step.

17. A semiconductor device production method for producing a semiconductor device including a transistor of a drift drain structure in which an oxide film thicker than a gate oxide film thereof is provided at an edge of a gate electrode thereof, the method comprising the steps of:

forming an oxidation resistant mask film which covers a semiconductor substrate;

forming a resist film on the oxidation resistant mask film, the resist film having resist openings in a pair of regions on opposite sides of a channel region;

implanting ions into the semiconductor substrate for formation of a pair of drift layers of the transistor by using the resist film having the resin openings as a mask;

selectively etching the oxidation resistant mask film by using the resist film as a mask to form a pair of mask openings in association with the pair of resist openings of the resist film in the oxidation resistant mask film;

thermally oxidizing a surface of the

semiconductor substrate by using the oxidation resistant mask film as a mask after the ion implanting step and the oxidation resistant mask selective etching step, whereby LOCOS oxide films are formed in association with the respective mask openings formed in the oxidation resistant mask film and the implanted ions are thermally diffused in the semiconductor substrate to form the pair of drift layers on the opposite sides of the channel region;

removing the oxidation resistant mask film;

forming a gate oxide film thinner than the LOCOS oxide films on the surface of the semiconductor substrate between the pair of drift layers; and

forming a gate electrode which extends from an upper side of the gate oxide film to upper sides of the LOCOS oxide films.